

# *Preliminary Draft*

## **A Data Exchange Standard for Optical/IR Interferometry**

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### **1 Introduction**

Considering the number of optical and infrared interferometers in operation or under construction it seems imperative that a standard be established which will allow the exchange of data among various groups. As a first step, we should try to agree on a standard for exchanging *calibrated* data. By first concentrating on calibrated data we only need those instrumental parameters which are required to characterize the data for subsequent analysis. Our ultimate goal is to cast the standard as a FITS file format definition, but first we should agree on what should be included in the standard.

[Jaffe and Cotton](#) have been working on a FITS file format for use with the VLTI backends. While the Jaffe and Cotton document contains elements to handle the storage of raw data, many of their elements are also needed for general data exchange. Below we summarize the information we think is needed for data exchange. In what follows we have loosely followed the FITS usage of keywords and column headings. The keywords can be considered as scalars, while the columns can be simply an array, or an array of pointers to other arrays. Allowed data types are: **I** = integer (16-bit), **A** = character, **E** = real, **D** = double, **L** = logical. The number in parentheses is the dimensionality of the entry.

### **2 Tables Defined by the Standard**

#### ***OI\_ARRAY***

##### Keywords

REVISION	<b>I</b>	Revision number of the table definition
ARRNAM	<b>A</b>	Array Name
FRAME	<b>A</b>	Coordinate Frame
		<i>Do we need a choice, or is GEOCENTRIC enough?</i>
ARRAYX		
ARRAYY	<b>D</b>	Array center coordinates
ARRAYZ		
DATE_OBS	<b>A</b>	Start date/time of observations

NELEMENT **I**      Number of array elements

Column Headings (one row for each telescope)

TEL\_NAME **A** (8)    Telescope name  
STA\_NAME **A** (8)    Station name  
INDEX **I** (1)      Station number  
*This may be used as an index into other tables.*  
DIAMETER **E** (1)    Element diameter  
STAXYZ **D** (3)      Station coordinates relative to array center  
POLN **A** (8)      Polarization state, ask GI2T group

**STAR**

Keywords

REVISION **I**      Revision number of the table definition  
NBANDS **I**      Number of wavelength bands

Column Headings (one row for each source)

STAR\_ID **I** (1)    Index number  
STAR **A** (8)      Star name  
CALCODE **A** (4)    Calibrator code, non-blank means calibrator  
MAG **E** (NBANDS)    Magnitude at each band, for calibrators  
BANDNAME **A** (NBANDS)    Wavelengths for magnitudes (band names?)  
RAEPP **D** (1)      RA at mean equinox  
DECEPP **D** (1)    DEC at mean equinox  
EQUINOX **D** (1)    Equinox  
RAPP **D** (1)      Apparent RA at beginning of observation  
DECAPP **D** (1)    Apparent DEC at beginning of observation  
RA\_ERR **D** (1)    Error in apparent RA  
DEC\_ERR **D** (1)    Error in apparent DEC  
SYSVEL **D** (1)    Systemic radial velocity  
VELTYP **A** (8)    Reference for radial velocity ('LSR', 'GEOCENTR', etc.)  
VELDEF **A** (8)    Definition of radial velocity ('OPTICAL', 'RADIO')  
PMRA **D** (1)      Proper motion in RA  
PMRA\_ERR **D** (1)    Error of proper motion in RA  
PMDEC **D** (1)    Proper motion in DEC  
PMDEC\_ERR **D** (1)    Error of proper motion in DEC  
PARALLAX **E** (1)    Parallax  
PARA\_ERR **E** (1)    Error in parallax  
SPECTYP **A** (8)    Spectral type

**WAVELENGTH**

Keywords

REVISION **I**      Revision number of the table definition  
NWAVE **I**      Number of wavelength channels

Column Headings (one row for each detector)

EFF\_WAVE **E** (NWAVE) Effective wavelength of each channel  
 EFF\_BAND **E** (NWAVE) Effective bandpass of each channel

## ***OI\_DATA***

### Keywords

REVISION **I** Revision number of the table definition  
 NUMREC **I** Number of records

### Column Headings (one row for each measurement)

STAR\_ID **I** (1) Star number as index into star table  
 TIME **D** (1) IAT time of observation  
 INT\_TIME **D** (1) Integration time

*Comment: At least one of the following must be present*

VISDATA **D** (NWAVE) Visibility - stored as a complex number  
 VISERR **D** (NWAVE) Error in Visibility

*or*

VIS2DATA **D** (NWAVE) Squared Visibility  
 VIS2ERR **D** (NWAVE) Error in Squared Visibility

*or*

T3AMP **D** (NWAVE) Triple Product Amplitude  
 T3AMPERR **D** (NWAVE) Errors in Triple Product Amplitude

*Triple amplitude may be meaningless, as is true for COAST*

T3PHI **D** (NWAVE) Triple Product Phase in degrees  
 T3PHIERR **D** (NWAVE) Errors in Triple Product Phase in degrees  
 NUV **I** (1) Number of UV points over which the data is averaged  
 UVCOORD **D** (NUV, 2) Coordinates of points over which data is averaged.  
 UVWEIGHT **D** (NUV) Weights of UV points over which the data is averaged  
 T3COORD **D** (4) UV coordinates of the triple product.  
 STATNUM **I** (3) Station numbers contributing to the data. 2 or 3 numbers  
 FLAG **L** (NWAVE) Flag

## **3 Optional Tables**

It may be useful to allow for some optional tables. For example, there might be one that contains instrument specific information, such as the backend configuration. Another optional table could contain information relevant to astrometry.